



The center and cyclicity problems for quartic linear-like reversible systems



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ABSTRACT

In this paper we study a family of quartic linear-like reversible polynomial systems having a nondegenerate center at the origin. This family has degree one with respect to one of the variables. We are interested in systems in this class having two extra nondegenerate centers outside the straight line of symmetry. The geometrical configuration of these centers is aligned or triangular. We solve the center problem in both situations and, in the second case, we study the limit cycles obtained from a simultaneous degenerate Hopf bifurcation in the quartic polynomials class.

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1. Introduction

Let us consider a planar analytic system of ordinary differential equations defined in a neighborhood of the origin, $(\dot{x}, \dot{y}) = (f(x, y), g(x, y))$. We are interested in the local structure of the solutions near an equilibrium point of nondegenerate center-focus type located at the origin. That is, a point with the Jacobian matrix having nonzero determinant and null trace. More specifically, assuming $f(0) = g(0) = 0$, if we write the

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